TiWi-uB2 Bluetooth Module

FEATURES

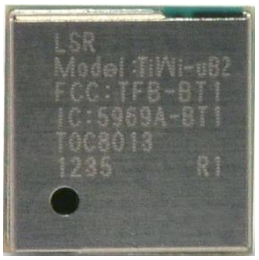
- Built in CC2564 single-chip Bluetooth fully supports BT 2.1 + EDR, BLE 4.0.
- RF Output Power: +10 dBm (Class 1.5)
- RF Receive Sensitivity: -94 dBm
- Miniature Size: 7 mm x 7 mm x 1.5 mm
- Operating Voltage: 2.2V to 4.8V
- Operating temperature: -30 to +85^{o} C
- Worldwide acceptance: FCC (USA), IC (Canada), and CE (Europe)
- RoHS compliant
- Supports maximum Bluetooth data rates over HCI UART interface.
- Supports multiple Bluetooth profiles with enhanced QoS, both mono and stereo, assisted A2DP

APPLICATIONS

- Medical (ex Heart Rate Monitor, Blood Pressure Sensor, Blood Glucose Meter)
- Thermometer
- Flood Alarm
- Heating Control
- Automatic Key Control
- Industrial Sensors
- Toys
- Entertainment Devices
- Mobile Accessories
- All Bluetooth Wireless Applications

DESCRIPTION

LSR would like to announce a low-cost and low-power consumption module which has all of the Bluetooth functionalities. The highly integrated TiWi-uB2 module makes the use of Bluetooth headsets and other applications possible.



The TiWi-uB2 module fully supports the dual mode Bluetooth and BLE operation, and the output power can support class 1.5. The SIP module provides UART interface / audio PCM interface for Bluetooth.

The SIP module is specifically developed for Smart phones and Portable devices.

Need to get to market quickly? Not an expert in Bluetooth? Need a custom antenna? Do you need help with your host board? LSR Design Services will be happy to develop custom hardware or software, or help integrate the design. Contact us at sales@lsr.com or call us at 262-375-4400.

ORDERING INFORMATION

Order Number	Description
450-0104	TiWi-uB2 Module (Tray)
450-0104R	TiWi-uB2 Module (Tape & Reel)
450-0105	TiWi-uB2 EM Board

Table 1 Orderable Model Numbers

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MODULE ACCESSORIES

	Order Number	Description
	001-0001	2.4 GHz Dipole Antenna with Reverse Polarity SMA Connector
	080-0001	U.FL to Reverse Polarity SMA Bulkhead Cable 105mm

Table 2 Module Accessories

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BLOCK DIAGRAM

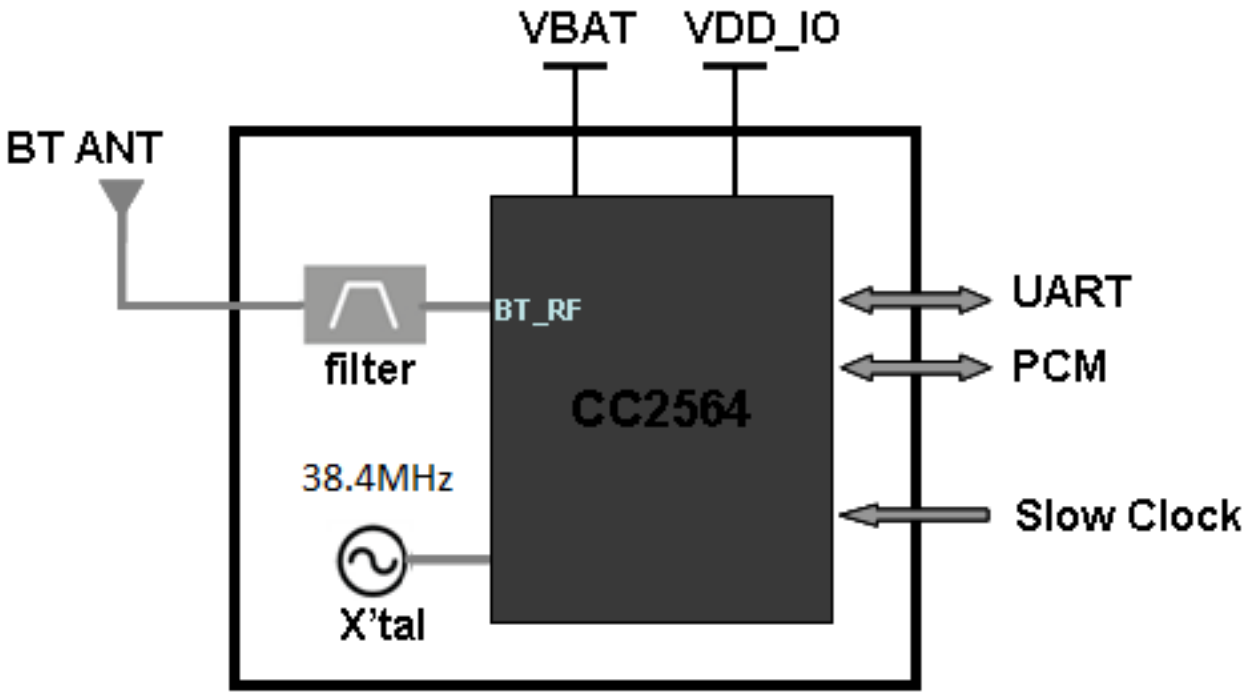

Figure 1 TiWi-uB2 Module Block Diagram

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FOOTPRINT AND PIN DEFINITIONS

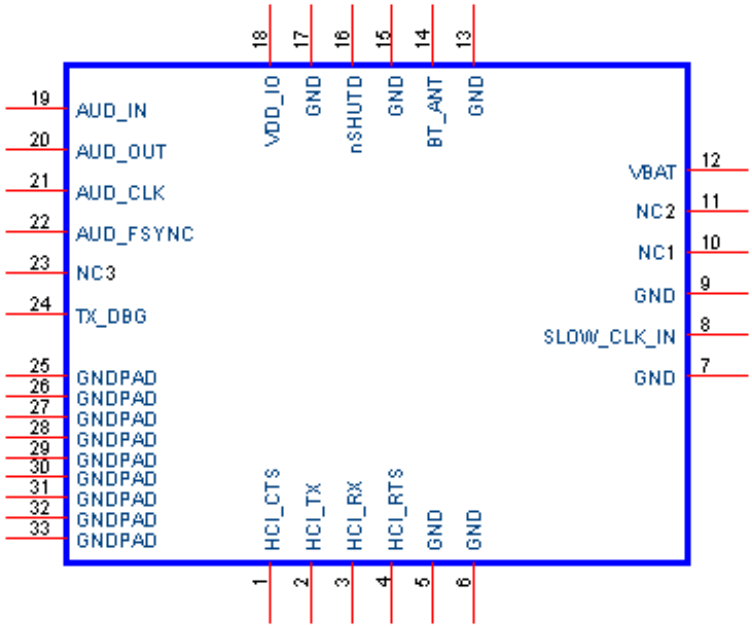

Figure 2 TiWi-uB2 Module Schematic View

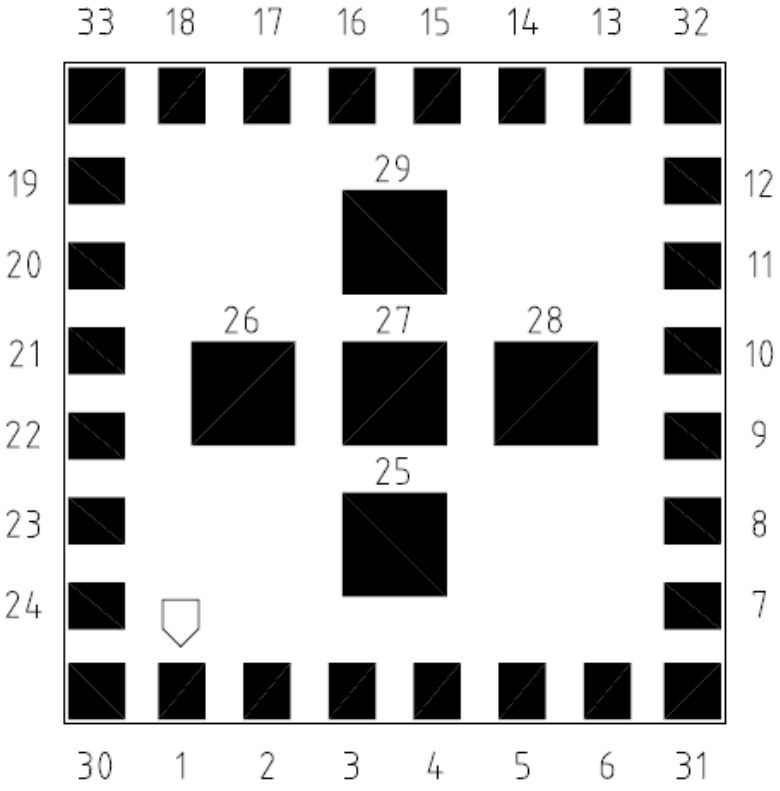

Figure 3 TiWi-uB2 Module Footprint View

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PIN DESCRIPTIONS

Module Pin	Name	I/O Type	Description
1	HCI_CTS	I	HCI UART CLEAR-TO-SEND
2	HCI_TX	O	HCI UART DATA TRANSMIT
3	HCI_RX	I	HCI UART DATA RECEIVE
4	HCI_RTS	O	HCI UART REQUEST-TO-SEND
5	GND	GND	GROUND
6	GND	GND	GROUND
7	GND	GND	GROUND
8	SLOW_CLK_IN	I	32.768 kHz CLOCK IN
9	GND	GND	GROUND
10	NC1	O	NO CONNECT 1 (DO NOT CONNECT)
11	NC2	O	NO CONNECT 2 (DO NOT CONNECT)
12	VBAT	PI	POWER TO MODULE (2.2V - 4.8V)
13	GND	GND	GROUND
14	BT_ANT	RF	ANTENNA, 50 OHMS
15	GND	GND	GROUND
16	nSHUTD	I	SHUTDOWN INPUT (ACTIVE LOW)
17	GND	GND	GROUND
18	VDD_IO	PI	I/O POWER SUPPLY (1.8V NOMINAL)
19	AUD_IN	I	PCM DATA INPUT (IF NOT USED, DO NOT CONNECT)
20	AUD_OUT	O	PCM DATA OUTPUT (IF NOT USED, DO NOT CONNECT)
21	AUD_CLK	IO	PCM CLOCK (IF NOT USED, DO NOT CONNECT)
22	AUD_FSYNC	IO	PCM FRAME SYNCH (IF NOT USED, DO NOT CONNECT)
23	NC3	O	NO CONNECT 3 (DO NOT CONNECT)
24	TX_DBG	O	LOGGER OUTPUT
25-33	GND	GND	GROUND

PI = Power Input
I = Input
O = Output
IO = Bi-directional Input Output Port
RF = Bi-directional RF Port
GND=Ground

Table 3 TiWi-uB2 Pin Descriptions

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ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Symbol	Description	Min	Max	Unit
VBAT	Input supply Voltage	-0.5	5.5	V
VDD_IO	Digital Bluetooth I/O Voltage	-0.5	2.145	V

Table 4 Absolute Maximum Ratings[1]

Recommended Operating Conditions

Test conditions: Ambient Temp = 25°C

Symbol	Min	Typ	Max	Unit
VBAT	2.2	3.3	4.8	V
VDD_IO	1.62	1.8	1.92	V

Table 5 Recommended Operating Conditions

[1] Under no circumstances should exceeding the ratings specified in the Absolute Maximum Ratings section be allowed. Stressing the module beyond these limits may result permanent damage to the module that is not covered by the warranty.

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General Characteristics

Characteristic	Description
Model Name	TiWi-uB2
Product Description	Bluetooth Wireless Module
Dimension	7.0 mm x 7.0 mm x 1.5 mm (W*L*T)
BT Interface	HCI UART, Audio PCM
Operating temperature	-30°C to 85°C
Storage temperature	-40°C to 85°C
Humidity	Operating Humidity 10% to 95% Non-Condensing Storage Humidity 5% to 95% Non-Condensing
Weight	0.18 g +/- 0.01g

Table 6 General Characteristics

Current Consumption for Active and Standby States

Mode Description	Min 25°C	Typ 25°C	Max 25°C	Min -40°C	Min -40°C	Typ -40°C	Max -40°C	Min 85°C	Typ 85°C	Max 85°C	Unit
Current consumption in shut-down mode(1)		1	3							7	µA
Current consumption in deep-sleep mode(2)		40	105								µA
Total I/O current consumption for active mode			1		1					1	µA

Table 7 Current Consumption for Active and Standby States

(1) Vbat + Vio
(2) Vbat + Vio + Vsd (shutdown)

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Current Consumption – for Different Bluetooth BR/EDR Scenarios

Conditions: VBAT = 3.6 V, VDD_IO = 1.8V, 25°C, 26 MHz fast clock, nominal unit, 4 dBm output power

Mode Description	Master/Slave	Average Current	Unit
Idle current (ARM off)	Master/slave	2.5	mA
SCO link HV3	Master/slave	12	mA
eSCO link EV3 64 kbps, no retransmission	Master/slave	11.5	mA
eSCO link 2-EV3 64 kbps, no retransmission	Master/slave	8.3	mA
GFSK full throughput: TX = DH1, RX = DH5	Master/slave	38.5	mA
EDR full throughput: TX = 2-DH1, RX = 2-DH5	Master/slave	39.2	mA
EDR full throughput: TX = 3-DH1, RX = 3-DH5	Master/slave	39.2	mA
Sniff, one attempt, 1.28 s	Master/slave	76/100	µA
Page or inquiry scan 1.28 s, 11.25 ms	Master/slave	300	µA
Page (1.28 s) and inquiry (2.56 s) scans, 11.25 ms	Master/slave	430	µA
Low power scan, 1.28-s interval, quiet environment	Master/slave	135	µA

Table 8 Bluetooth Power Consumption

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Current Consumption – for Different Bluetooth LE Scenarios

Conditions: VBAT = 3.6 V, VDD_IO = 1.8V, 25°C, 26 MHz fast clock, nominal unit, 10 dBm output power

Mode	Description	Average Current	Unit
Advertising, non-connectable	Advertising in all 3 channels 1.28msec advertising interval 15Bytes advertise data	104	µA
Advertising, discoverable	Advertising in all 3 channels 1.28msec advertising interval 15Bytes advertise data	121	µA
Scanning	Listening to a single frequency per window 1.28msec scan interval 11.25msec scan window	302	µA
Connected (master role)	500msec connection interval 0msec Slave connection latency Empty Tx/Rx LL packets	169	µA

Table 9 Bluetooth Power Consumption

Power Consumption – Bluetooth

Conditions: VBAT = 3.3V, VDD_IO = 1.8V, Ambient Temp = 25°C

Packet type	Typ	Max	Unit
DM1	47.1		mA
DH1	30.2		mA
DM3	21.3		mA
DH3	17.4		mA
DM5	15.6		mA
DH5	13.0		mA
Deep Sleep Mode	0.033		mA
Constant RX	44.5		mA
BER Mode	38.8		mA

Table 10 Bluetooth VBAT Power Consumption

Packet type	Typ	Max	Unit
DM1	0.069		mA
DH1	0.069		mA
DM3	0.069		mA
DH3	0.069		mA
DM5	0.069		mA
DH5	0.069		mA
Deep Sleep mode	0.032		mA
Constant RX	0.069		mA
BER Mode	0.069		mA

Table 11 Bluetooth VDDIO Power Consumption

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Bluetooth RF Characteristics

General Specifications

Feature	Description
Bluetooth Standard	Bluetooth 4.0 (with EDR)
Host Interface	HCI UART, PCM
Antenna Reference	Small antennas with 0~2 dBi peak gain
Frequency Band	2.402 GHz ~ 2.480 GHz
Number of Channels	79 channels
Modulation	FHSS, GFSK, DPSK, DQPSK

Table 12 Bluetooth General Specifications

RF Characteristics

Test Conditions : VBAT = 3.3V, VDD_IO = 1.8V

Characteristic	Condition	-30°C Typ	25°C Typ	85°C Typ	BT Spec	Unit
Output Power	Class 1.5	9.5	10	10.8		dBm
Modulation GFSK	dF1 avg	158	158	158	140~ 175	KHz
	dF2 max	138	137	136	>115	KHz
	$dF2_{avg}$ / $dF1_{avg}$	90	90	90	80	%
Modulation EDR at 8DPSK	RMS DEVM	5	5	5	13	%
	99% DEVM	10	10	10	20	%
	Peak DEVM	13	13	13	25	%
Sensitivity at Dirty Tx On	GFSK at BER = 0.1%	-95	-94	-93	-70	dBm
	π/4-DQPSK at BER = 0.01%	-93	-92	-91	-70	dBm
	8DPSK at BER = 0.01%	-86	-85	-84	-70	dBm
Maximum Input Level	GFSK at BER = 0.1%	-5	-5	-5	-20	dBm
	π/4-DQPSK at BER = 0.1%	-10	-10	-10	-20	dBm
	8DPSK at BER = 0.1%	-10	-10	-10	-20	dBm

Table 13 Bluetooth RF Characteristics

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BLUETOOTH POWER-UP/ DOWN SEQUENCE

Power up requirements:

- nSHUTD must be low. VDD_IN and VDD_IO are don't-care when nSHUTD is low. However, no signals are allowed on the I/O pins if no I/O power is supplied, because the I/Os are not fail-safe. Exceptions are SLOW_CLK_IN, XTALP, XTALM, and AUD_xxx, which are fail-safe and can tolerate external voltages with no VDD_IO and VDD_IN.
- VDD_IO and VDD_IN must be stable before releasing nSHUTD.
- Fast clock must be stable maximum 20 ms after nSHUTD goes high.
- Slow clock must be stable within 2 ms of nSHUTD going high.

The CC256x indicates that the power-up sequence is complete by asserting RTS low. This occurs up to100 ms after nSHUTD goes high.

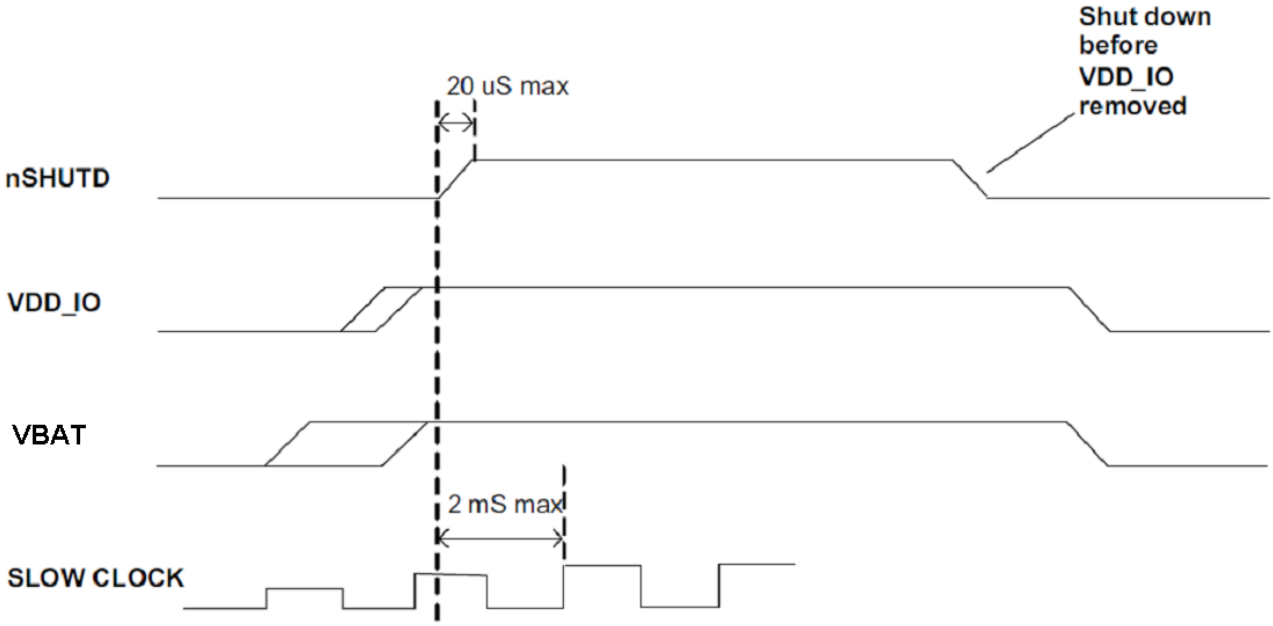

Figure 4 Bluetooth Power-Up/Down Sequence

nSHUTD Requirements

Parameter	Symbol	Min	Max	Unit
Operation mode level (1)	V_{IH}	1.42	1.98	V
Shutdown mode level (1)	V_{IL}	0	0.4	V
Minimum time for nSHUT_DOWN low to reset the device		5		
Rise/fall times	Tr/Tf		20	us

(1) Internal pull-down retains shutdown mode when no external signal is applied to this pin.

Table 14 nSHUTD Requirements

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Power Supplies and Shutdown—Static States

The nSHUTD signal puts the CC256x in ultra-low power mode and also performs an internal reset to the device. nSHUTD rise time must not exceed 20 µs, and nSHUTD must be low for a minimum of 5 ms. All I/O pins are set to high-impedance state during shut down and power up of the CC256x device to prevent conflicts with external signals. The internal pull resistors are enabled on each I/O pin.

	VDD_IN(1)	VDD_IO(1)	nSHUTD(1)	PM_MODE	Comments
1	None	None	Asserted	Shut Down	I/O state is undefined. No I/O voltages allowed on non fail-safe pins.
2	None	None	Deasserted	Not Allowed	I/O state is undefined. No I/O voltages allowed on non fail-safe pins.
3	None	Present	Asserted	Shut Down	IOs are defined as 3-state with internal pullup/pulldown enabled.
4	None	Present	Deasserted	Not Allowed	I/O state is undefined. No I/O voltages allowed on non fail-safe pins.
5	Present	None	Asserted	Shut Down	I/O state is undefined. No I/O voltages allowed on non fail-safe pins.
6	Present	None	Deasserted	Not Allowed	I/O state is undefined. No I/O voltages allowed on non fail-safe pins.
7	Present	Present	Asserted	Shut Down	IOs are defined as 3-state with internal pullup/pulldown enabled.
8	Present	Present	Deasserted	Active	See *Table 16 I/O States in Various Power Modes*

Table 15 Power Modes

(1) None/Asserted can be any of the following conditions: directly pulled to ground/driven low, pulled to ground through pull down resistor, or left NC/floating (high-impedance output stage).

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I/O Name	Shut Down		Default Active (1)		Deep Sleep (2)	
	I/O State	Pull	I/O State	Pull	I/O State	Pull
HCI_RX	Z	PU	I	PU	I	(3)
HCI_TX	Z	PU	O-H	-	O	-
HCI_RTS	Z	PU	O-H	-	O	-
HCI_CTS	Z	PU	I	PU	I	(3)
AUD_CLK	Z	PD	I	PD	I	PD
AUD_FSYNC	Z	PD	I	PD	I	PD
AUD_IN	Z	PD	I	PD	I	PD
AUD_OUT	Z	PD	Z	PD	Z	PD
I2C_SCL	Z	(4)	I	(4)	I	(4)
I2C_SDA	Z	(4)	I	(4)	I	(4)
TX_DBG	Z	PU	O	-		

Table 16 I/O States in Various Power Modes

(1) I = input, O = output, Z = HiZ, — = no pull
(2) Shown only if different from active. Can be changed by vendor-specific command.
(3) PU or no pull - depends on setting in init script.
(4) PU if TX_DBG = 1 at shutdown, PD if TX_DBG = 0 at shutdown.

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SLOW CLOCK (32 KHZ) SOURCE REQUIREMENTS

External Slow Clock signal characteristics

Characteristic	Condition	Sym	Min	Typ	Max	Unit
Input slow clock frequency				32768		Hz
Input slow clock accuracy (Initial + temp + aging)			-250		250	ppm
Input transition time t_r/t_f - 10% to 90%			t_r/t_f		100	ns
Frequency input duty cycle			15	50	85	%
Phase noise	At 1 kHz				-125	dBc/Hz
Jitter	Integrated over 300 to 15000 Hz				1	Hz
Slow clock input voltage limits	Square wave, DC coupled	V_{IH}	0.65 x VDD_IO		VDD_IO	V peak
		V_{IL}	0		0.35 x VDD_IO	V peak
Input impedance			1			MΩ
Input capacitance					5	pF

Table 17 32 kHz Clock Requirements

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BLUETOOTH HCI UART

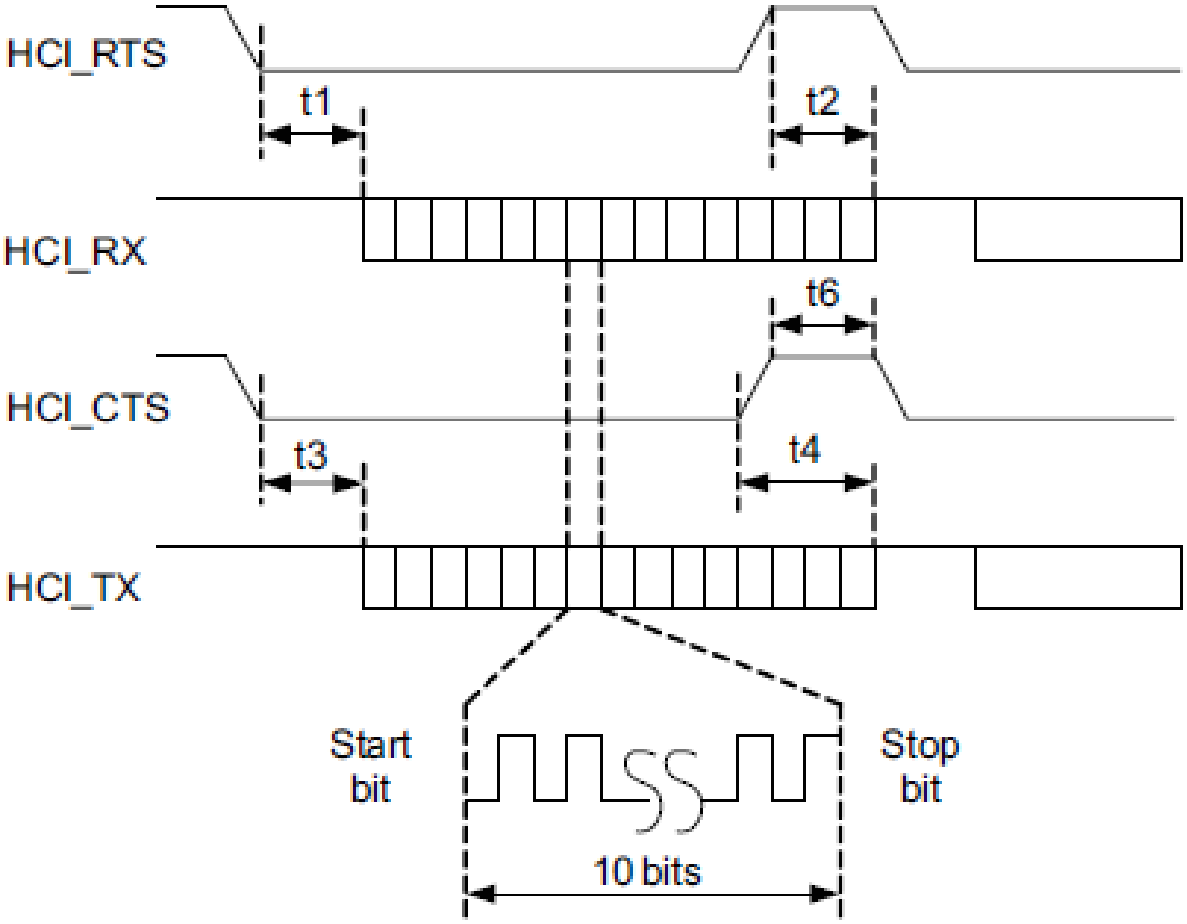

Figure 5 Bluetooth HCI UART Timing

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
	Baud rate		37.5		4000	kbps
	Baud rate accuracy		-2.5		1.5	%
t3	CTS low to TX_DATA on		0	2		us
t4	CTS high to TX_DATA off	Hardware flow control			1	byte
t6	CTS high pulse width		1			Bit
t1	RTS low to RX_DATA on		0	2		us
t2	RTS high to RX_DATA off	Interrupt set to ¼ FIFI			16	byte

Table 18 Bluetooth HCI UART Timing

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BLUETOOTH AUDIO CODEC/PCM

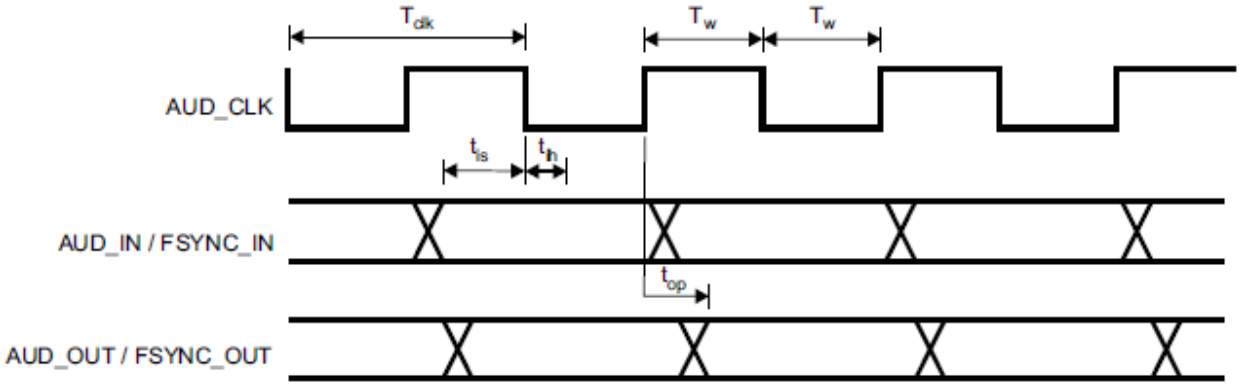

Figure 6 Bluetooth PCM Timing

PCM Master

Symbol	Parameter	Condition	Min	Max	Unit
T_{clk}	Cycle time		166.67 (6 MHz)	15625 (64 kHz)	ns
T_W	High or low pulse width		50% of T_{clk} min		ns
t_{is}	AUD_IN setup time		25		ns
t_{ih}	AUD_IN hold time		0		ns
t_{op}	AUD_OUT propagation time	40pF load	0	10	ns
t_{op}	FSYNC_OUT propagation time	40pF load	0	10	ns

Table 19 Bluetooth PCM Master Timing

PCM Slave

Symbol	Parameter	Condition	Min	Max	Unit
T_{clk}	Cycle time		62.5 (16 MHz)		ns
T_W	High or low pulse width		40% of T_{clk}		ns
t_{is}	AUD_IN setup time		8		ns
t_{ih}	AUD_IN hold time		0		ns
t_{is}	AUD_FSYNC setup time		8		ns
t_{ih}	AUD_FSYNC hold time		0		ns
t_{op}	AUD_OUT propagation time	40pF load	0	21	ns

Table 20 Bluetooth PCM Slave Timing

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SOLDERING RECOMMENDATIONS

Recommended Reflow Profile for Lead Free Solder

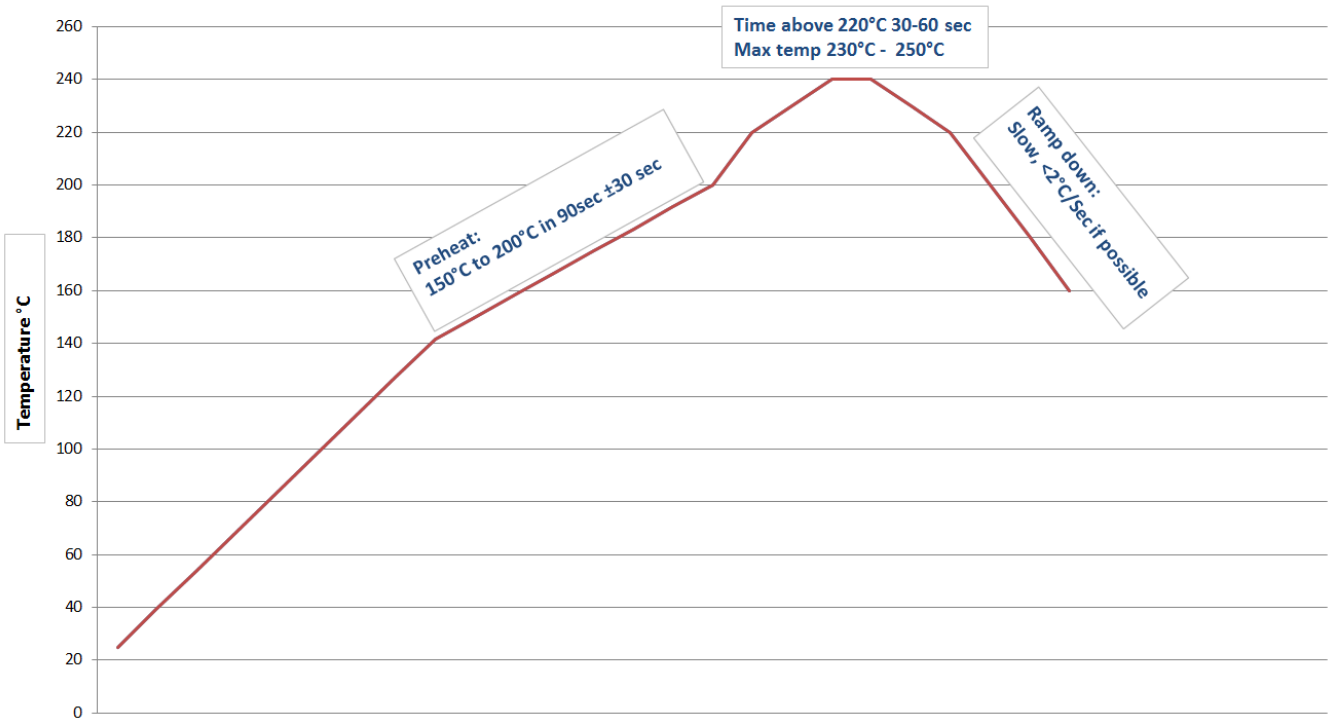

Figure 7 Recommended Soldering Profile

Note: The quality of solder joints on the surface mount pads where they contact the host board should meet the appropriate IPC Specification. See IPC-A-610-D Acceptability of Electronic Assemblies, section 8.2.1 "Bottom Only Terminations."

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CLEANING

In general, cleaning the populated modules is strongly discouraged. Residuals under the module cannot be easily removed with any cleaning process.

- Cleaning with water can lead to capillary effects where water is absorbed into the gap between the host board and the module. The combination of soldering flux residuals and encapsulated water could lead to short circuits between neighboring pads. Water could also damage any stickers or labels.
- Cleaning with alcohol or a similar organic solvent will likely flood soldering flux residuals into the RF shield, which is not accessible for post-washing inspection. The solvent could also damage any stickers or labels.
- Ultrasonic cleaning could damage the module permanently.

OPTICAL INSPECTION

After soldering the Module to the host board, consider optical inspection to check the following:

- Proper alignment and centering of the module over the pads.
- Proper solder joints on all pads.
- Excessive solder or contacts to neighboring pads, or vias.

REWORK

The module can be unsoldered from the host board if the Moisture Sensitivity Level (MSL) requirements are met as described in this datasheet.

Never attempt a rework on the module itself, e.g. replacing individual components. Such actions will terminate warranty coverage.

SHIPPING, HANDLING, AND STORAGE

Shipping

Bulk orders of the TiWi-uB2 modules are delivered in trays of 416 (13 x 32) or reels of 2,000.

Handling

The TiWi-uB2 modules contain a highly sensitive electronic circuitry. Handling without proper ESD protection may damage the module permanently.

Moisture Sensitivity Level (MSL)

Per J-STD-020, devices rated as MSL 4 and not stored in a sealed bag with desiccant pack should be baked prior to use.

Devices are packaged in a Moisture Barrier Bag with a desiccant pack and Humidity Indicator Card (HIC). Devices that will be subjected to reflow should reference the HIC and J-STD-033 to determine if baking is required.

If baking is required, refer to J-STD-033 for bake procedure.

Storage

Per J-STD-033, the shelf life of devices in a Moisture Barrier Bag is 12 months at <40ºC and <90% room humidity (RH).

Do not store in salty air or in an environment with a high concentration of corrosive gas, such as Cl2, H2S, NH3, SO2, or NOX.

Do not store in direct sunlight.

The product should not be subject to excessive mechanical shock.

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Repeating Reflow Soldering

Only a single reflow soldering process is encouraged for host boards.

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AGENCY CERTIFICATIONS

FCC ID: TFB-BT1, 15.247

IC ID: 5969A-BT1, RSS 210

CE: Compliant to standards EN 60950-1, EN 300 328, and EN 301 489

AGENCY STATEMENTS

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This portable transmitter with its antenna complies with FCC/IC RF exposure limits for general population / uncontrolled exposure.

FCC CAUTION: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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Industry Canada Statements

This device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This device has been designed to operate with the antenna(s) listed below, and having a maximum gain of 2.0 dBi (LSR Dipole) and 1.3dBi (Johanson Chip). Antennas not included in this list or having a gain greater than 2.0 dBi and 1.3dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

List of all Antennas Acceptable for use with the Transmitter

1) LSR 001-0001 center-fed dipole antenna and LSR 080-0001 U.FL to Reverse Polarity SMA connector cable.
2) Johanson 2450AT43B100 chip antenna.

Cet appareil est conforme aux normes d'Industrie Canada exempts de licence RSS (s). L'opération est soumise aux deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doiventêtre choisis de manière que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pascelle permise pour une communication réussie.

Cet appareil a été conçu pour fonctionner avec l'antenne (s) ci-dessous, et ayant un gain maximum de 2,0 dBi (LSR dipôle) et1.3dBi (Chip Johanson). Antennes pas inclus danscette liste ou d'avoir un gain supérieur à 2,0 dBi et-1.3dBi sont strictement interdites pour l'utilisation avec cet appareil. L'impédance d'antenne requise est de 50 ohms.

Liste de toutes les antennes acceptables pour une utilisation avec l'émetteur

1) LSR 001-0001 alimenté par le centre antenne dipôle et LSR 080-0001 U.FL d'inversion de polarité du câble connecteur SMA.
2) Antenne Johanson puce 2450AT43B100.

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OEM RESPONSIBILITIES TO COMPLY WITH FCC AND INDUSTRY CANADA REGULATIONS

The TiWi-uB2 Module has been certified for integration into products only by OEM integrators under the following conditions:

The antennas for this transmitter must not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter procedures. Co-location means having a separation distance of less than 20 cm between transmitting antennas.

As long as the two conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions cannot be met (for certain configurations or co-location with another transmitter), then the FCC and Industry Canada authorizations are no longer considered valid and the FCC ID and IC Certification Number cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC and Industry Canada authorization.

Le module de TiWi-uB2 a été certifié pour l'intégration dans des produits uniquement par des intégrateurs OEM dans les conditions suivantes:

Les antennes pour ce transmetteur ne doit pas être co-localisés avec les autres émetteurs sauf en conformité avec la FCC et Industrie Canada multi-émetteur procédures. Co-localisation des moyens ayant une distance de séparation inférieure à 20 cm entre les antennes d'émission.

Tant que les deux conditions précitées sont réunies, les tests de transmetteurs supplémentaires ne seront pas tenus. Toutefois, l'intégrateur OEM est toujours responsable de tester leur produit final pour toutes les exigences de conformité supplémentaires requis avec ce module installé (par exemple, les émissions appareil numérique, les exigences de périphériques PC, etc.)

NOTE IMPORTANTE: Dans le cas où ces conditions ne peuvent être satisfaites (pour certaines configurations ou de co-implantation avec un autre émetteur), puis la FCC et Industrie autorisations Canada ne sont plus considérés comme valides et l'ID de la FCC et IC numéro de certification ne peut pas être utilisé sur la produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'un distincte de la FCC et Industrie Canada l'autorisation.

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OEM LABELING REQUIREMENTS FOR END-PRODUCT

The TiWi-uB2 module is labeled with its own FCC ID and IC Certification Number. The FCC ID and IC certification numbers are not visible when the module is installed inside another device, as such the end device into which the module is installed must display a label referring to the enclosed module. The final end product must be labeled in a visible area with the following:

"**Contains Transmitter Module FCC ID: TFB-BT1"**

"**Contains Transmitter Module IC: 5969A-BT1"**

or

"**Contains FCC ID: TFB-BT1"**

"**Contains IC: 5969A-BT1"**

The OEM of the TiWi-uB2 Module must only use the approved antenna(s) listed above, which have been certified with this module.

Le module de TiWi-uB2 est étiqueté avec son propre ID de la FCC et IC numéro de certification. L'ID de la FCC et IC numéros de certification ne sont pas visibles lorsque le module est installé à l'intérieur d'un autre appareil, comme par exemple le terminal dans lequel le module est installé doit afficher une etiquette faisant référence au module ci-joint. Le produit final doit être étiqueté dans un endroit visible par le suivant:

"Contient Module émetteur FCC ID: TFB-BT1"
"Contient Module émetteur IC: 5969A-BT1"

ou

"Contient FCC ID: TFB-BT1"
"Contient IC: 5969A-BT1"

Les OEM du module TiWi-uB2 ne doit utiliser l'antenne approuvée (s) ci-dessus, qui ont été certifiés avec ce module.

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OEM END PRODUCT USER MANUAL STATEMENTS

The OEM integrator should not provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user manual of the end product.

Other user manual statements may apply.

L'intégrateur OEM ne devraient pas fournir des informations à l'utilisateur final sur la façon d'installer ou de supprimer ce module RF ou modifier les paramètres liés RF dans le manuel utilisateur du produit final.

Autres déclarations manuel de l'utilisateur peuvent s'appliquer.

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EUROPE

CE Notice

This device has been tested and certified for use in the European Union. See the Declaration of Conformity (DOC) for specifics.

If this device is used in a product, the OEM has responsibility to verify compliance of the final product to the EU standards. A Declaration of Conformity must be issued and kept on file as described in the Radio and Telecommunications Terminal Equipment (R&TTE) Directive.

The 'CE' mark must be placed on the OEM product per the labeling requirements of the Directive.

Declaration of Conformity (DOC)

The DOC can be downloaded from the LSR Wiki.

BLUETOOTH CERTIFICATION

The TiWi-uB2 module has been certified as a Controller Subsystem and has a QDID of B020349. An End Product Listing (EPL) can be created when this device is combined with a Host Subsystem QDID. The cost for creating an EPL by combination of the Controller Subsystem and Host Subsystem QDIDs is free of charge. See the Bluetooth website for additional details on the EPL process.

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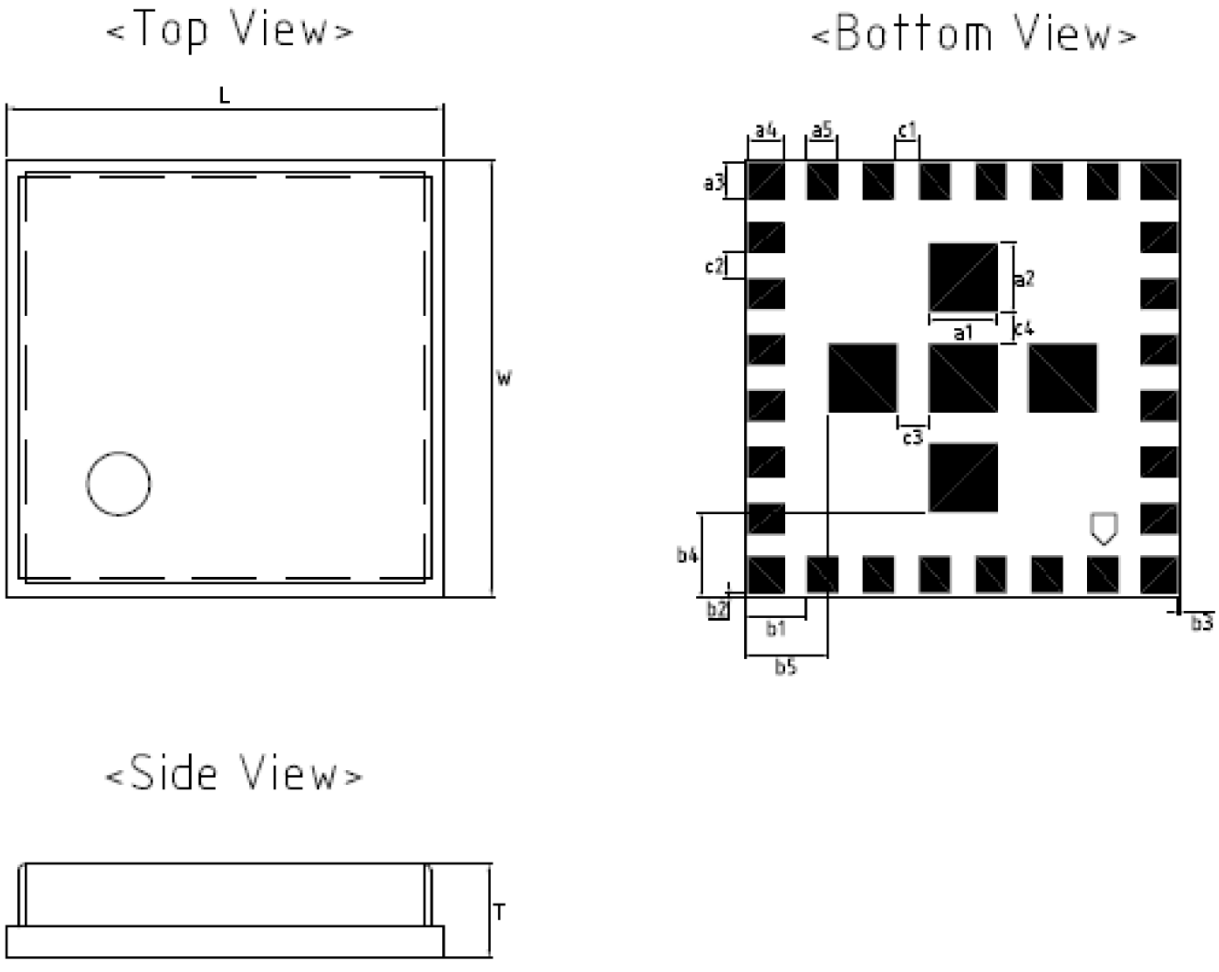
MECHANICAL DATA



Dimensions (unit: mm)

MARK	Dimensions	MARK	Dimensions	MARK	Dimensions
L	7 +/- 0.1	W	7 +/- 0.1	T	1.5 Max
a1	1.1 +/- 0.2	a2	1.1 +/- 0.2	a3	0.6 +/- 0.1
a4	0.6 +/- 0.1	a5	0.5+/- 0.1	b1	1 +/- 0.2
b2	0.05 +/- 0.05	b3	0.05 +/- 0.05	b4	1.35 +/- 0.2
b5	1.35 +/- 0.2	c1	0.4 +/- 0.05	c2	0.4 +/- 0.05
c3	0.5 +/- 0.2	c4	0.5 +/- 0.2		

Figure 8 Module Mechanical Dimensions

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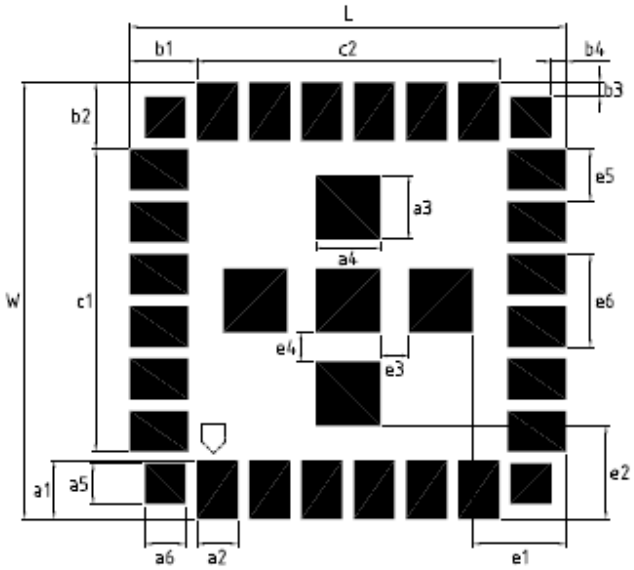

Dimensions (unit: mm)

MARK	Dimensions	MARK	Dimensions	MARK	Dimensions
L	7.51 +/- 0.1	W	7.51 +/- 0.1	a1	1 +/- 0.2
a2	0.7 +/- 0.2	a3	1.1 +/- 0.1	a4	1.1 +/- 0.1
a5	0.7+/- 0.1	a6	0.7+/- 0.1	b1	1.15 +/- 0.2
b2	1.15 +/- 0.2	b3	0.25 +/- 0.02	b4	0.25 +/- 0.02
c1	5.2 +/- 0.05	c2	5.2 +/- 0.05	e1	1.6 +/- 0.1
e2	1.6 +/- 0.1	e3	0.5 +/- 0.05	e4	0.5 +/- 0.05
e5	0.9 +/- 0.05	e6	1.6 +/- 0.05		

Figure 9 Soldering Footprint for Host Board and Module Placement

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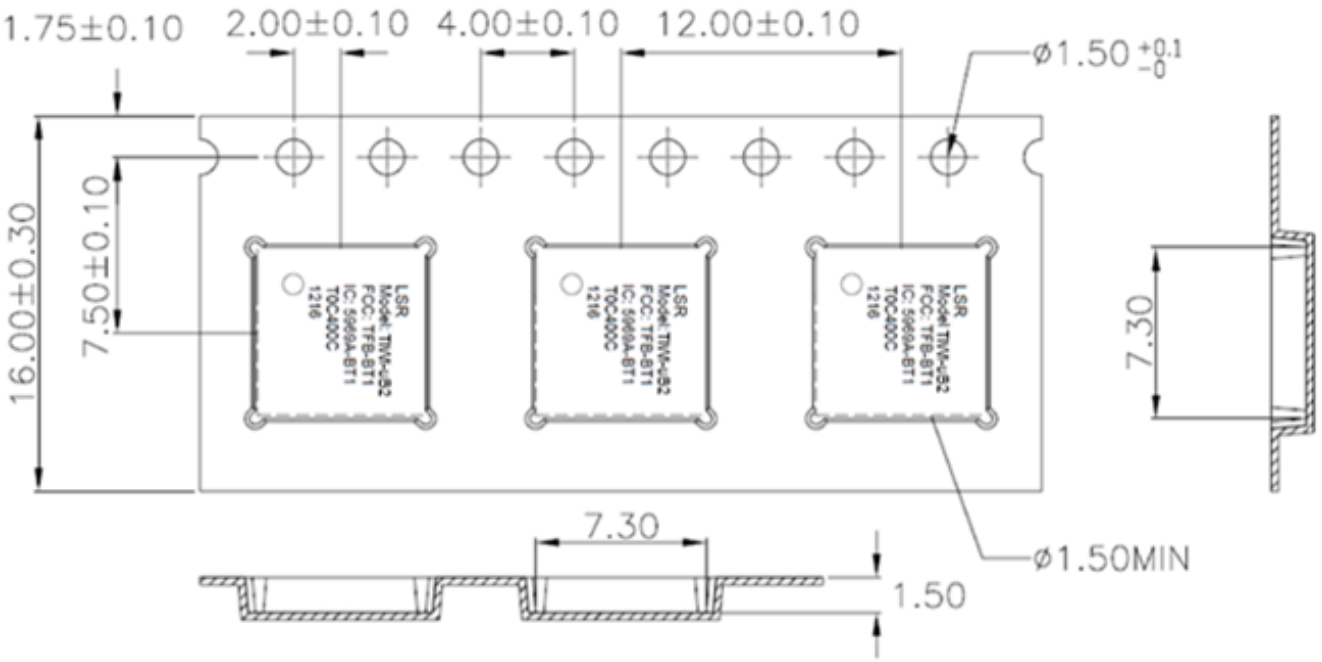
Tape & Reel Dimensions



1. All dimensions in mm. All tolerances are as shown.
2. 10 sprocket hole pitch cumulative tolerance ± 0.20 mm.
3. Carrier camber is within 1 mm in 250 mm.
4. Material: Black Conductive Polystyrene Alloy.
5. All dimensions meet EIA-481-D requirements.
6. Thickness: 0.30 mm ± 0.05 mm.
7. Component load per 330,2 mm (13") Dia. reel : 2000 pcs.

Figure 10 Tape and Reel Specification

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Tray Dimensions

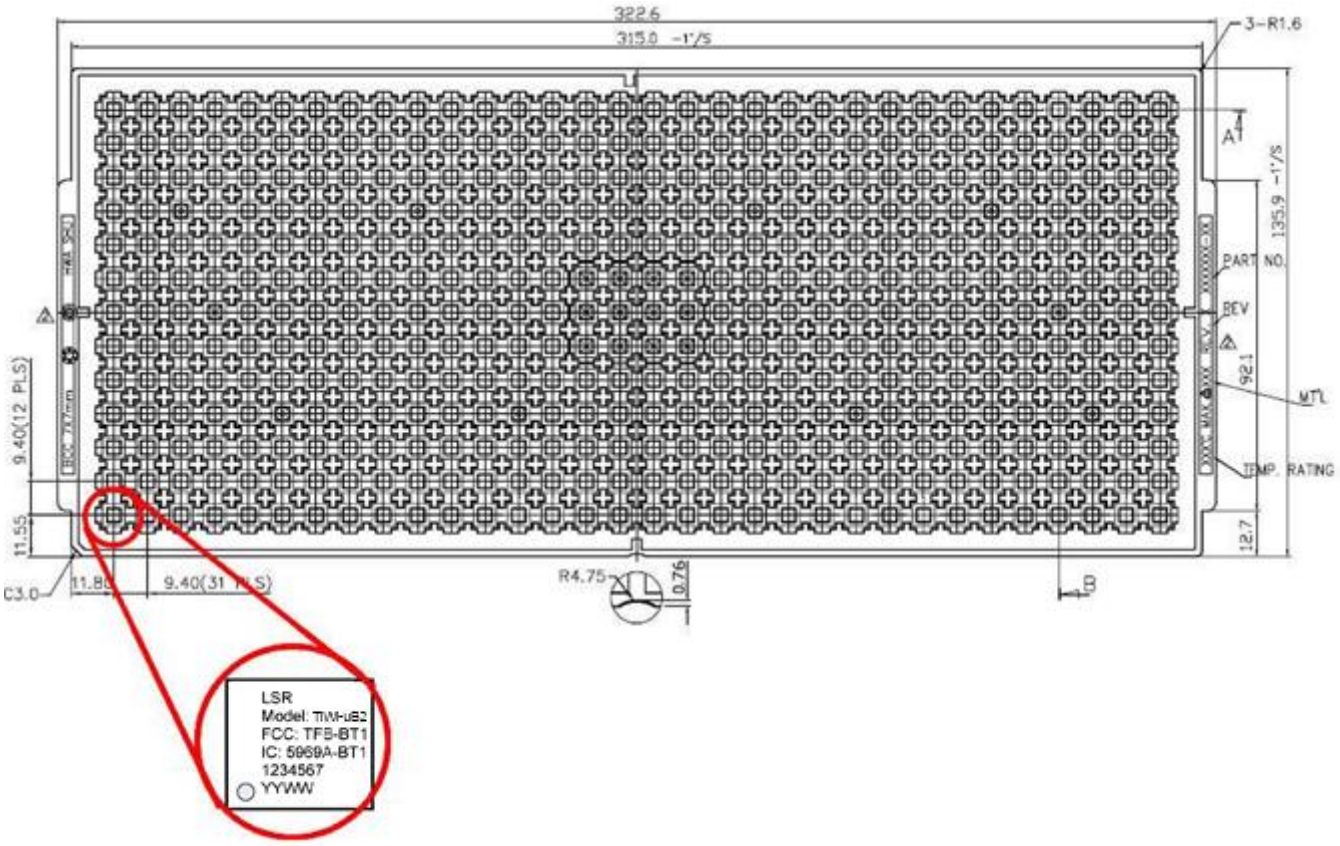

Figure 11 Tray Specification

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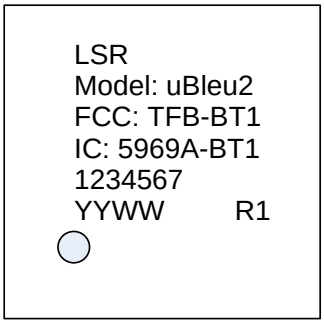
DEVICE MARKINGS

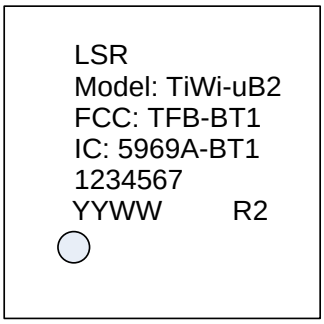
Rev 1 Devices



1234567 = Lot Code
- 1 = production region (ex: Taiwan = T)
- 23 = production year in hex (ex: 2012 = 0A)
- 4 = production month in hex (ex: Jul = 7)
- 567 = last 3 numbers of tracking card in hex

YYWW = Date Code (YY=Year, WW=Week)
R1 = Rev 1

Rev 2 Devices



1234567 = Lot Code
- 1 = production region (ex: Taiwan = T)
- 23 = production year in hex (ex: 2012 = 0A)
- 4 = production month in hex (ex: Jul = 7)
- 567 = last 3 numbers of tracking card in hex

YYWW = Date Code (YY=Year, WW=Week)
R2 = Rev 2

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